The present invention includes a discharge conveyor having a rotatable drum positioned at its discharge end. The rotatable drum is comprised of a plurality of disks. Two pairs of air nozzles are positioned between the rotating disks of the rotatable drum. A receiving conveyor is positioned below the discharge end of the first conveyor. Bagged food products move along the discharge conveyor and are discharged over the rotating drum thereof. As each product bag falls toward the receiving conveyor, air blasts assist in uprighting, i.e., collating the product bag. A sensor indicates when the product bag is properly positioned to receive the air blasts for uprighting the bag. The present invention further includes a programmable logic controller ("PLC") which controls the speed and incremental movement of the conveyors, as well as the air pressure and the air blast duration required to effect collating.

Referring to FIGURES 5A and 6, therein is illustrated an upper pair of air nozzles 382 and a lower pair of air nozzles 384 positioned between the rotating disks 342, 343, 344 and 345 of the drum ~~200~~300. Nozzles 382 and 384 are connected to a conventional compressed air source 388. It will be understood by those skilled in the art that any non-corrosive pressurized gas may be used in the practice of the invention. The upper air nozzles 382 are positioned to discharge an air blast that will strike large and extra large size product bags P having heights ranging from about 10 to about 18 inches. The lower nozzles 384 are positioned to discharge an air blast that will strike small and medium product bags P having heights ranging from about 4 to about 10 inches. The upper nozzles discharge air at about 60 psi (FIGURE 8A), and the lower nozzles discharge air at about 30 psi (FIGURE 8B) because the weight of the larger product bags requires more thrust in order to tip the bags received by the second conveyor 200 to a desired 70 degree angle from horizontal.

A sensor 600 indicates when the product bag P is properly positioned to receive the air blast for uprighting the product bag. The sensor 600 includes a light beam source 602 positioned on a first side of the second conveyor, a reflector 604 positioned across from the light source on the second side of the second conveyor and a

light beam receiver 606 positioned on the first side of the second conveyor ~~300~~200. A falling product bag P interrupts the light beam and generates a signal indicating the presence of the product bag. It will be understood that any type of sensor capable of indication of the position of the product bag may be used in the practice of the invention. As is clearly shown in FIGURE 4, the light path between the source, the reflector, and the receiver is angular, which allows detection of all bag sizes without adjustment.

When the predetermined number of product bags have been discharged into the container C-1, the positioning of the deflector 710 is changed from the position shown in full lines in FIGURE 15 to the position shown in dashed lines therein. Thereafter the deflector 710 directs product bags discharged from the conveyor 200' into the container C-2. During discharge of the product bags into the container C-2, the operator removes the now full container C-1 and replaces the container C-1 with an empty container. The discharge of product bags into the container C-2 continues until the programmable logic controller 400' receives output signals from the sensor 600' and/or any other source indicating that a predetermined number of product bags have been discharged into the container C-2. At that point, the positioning of the deflector 710 is reversed and the foregoing cycle is repeated.

Referring to Figures 18 and 19, there is shown a collator 800 comprising a third embodiment of the invention. The collator 800 comprises component parts which are substantially identical in construction and function to the component parts of the collator 10 and the collator 700 as illustrated in Figures 1-17, inclusive, and described hereinabove in conjunction therewith. Further description of such identical component parts has been omitted from the description of the collator 800 for brevity.

Bagged food products received by the collator 800 are directed either to the conveyor 802 or to the conveyor 804 by a chute 820 and a chute 822 which are located at the input end of the conveyor 100. The chute 822 is fixedly supported and functions to direct bagged food products either to the conveyor 802 or to the conveyor 804. The chute 820 is supported for rocking movement about an axis 824 under the action of an activator 826 which may comprise a pneumatic cylinder, a hydraulic cylinder, and electrical solenoid, etc. which is connected to the chute 820 by a suitable linkage and which is operated under the control of the programmable logic controller of the collator 800. The chute 820 has two operating positions, one of which directs bagged food products onto the chute 822 and from the chute 822 onto the conveyor 802, and the other of which directs bagged food products onto the chute 822 and from the chute 822 onto the conveyor 804.

In the operation of the collator 800, the chute 820 may be operated pursuant to a variety of operational modes. For example, the positioning of the chute 820 may be switched between the two operational configurations thereof each time a bagged food product is received by the collator 800. Preferably, however, the chute 820 remains in one of its operational configurations until a predetermined number of bagged food products has been received by the collator 800, for example, 6, 8, or 10 bagged food products. When the predetermined number of bagged food products has been received by the collator 800, the chute 820 is pivoted to its alternate operational configuration and remains therein until the predetermined number of bagged food products has been received by the collator 800, whereupon the operational cycle begins again.

Referring to Figures 26, 27, and 28, inclusive, the dual track air assisted collator 900 further includes support rods 930 extending transversely across the discharge conveyors 906 comprising the conveyor assemblies 902 and 904. Guide members 932 are supported from the ~~guide~~ support rods 930 and are selectively positionable relative to the discharge conveyors 906, it being understood by those skilled in the art that the positioning of the guide members 932 depends upon the sizes of the bagged food products being conveyed. Locking members 934 are provided for securing the guide members 932 in selected locations.

Figure 26 illustrates the diverter members 914 positioned to direct bagged food products to the discharge conveyor 906 comprising the conveyor assembly 902. Figure 27 illustrates the diverter members 914 positioned to direct bagged food products to the discharge conveyor 906 comprising the conveyor assembly 904.

Figure 28 illustrates an important feature of the invention wherein the collator 900 is configured for use in conjunction with larger sizes of bagged food products. The diverter members 914 are centrally disposed, and the guide members 932 are moved outwardly and secured in widely spaced apart locations to define a central discharge conveyor path. As will be understood by those skilled in

the art, the central conveyor path includes belts 910 which comprises component parts of both the discharge conveyor 906 of the conveyor assembly 902 and the discharge conveyor 906 of the conveyor assembly 904.

Upon receipt in the collator 900, bagged food products move downwardly along the slide 940 under the action of gravity. From the slide 940 the bagged food products move into the space between the diverter members 914. The diverter members 914 are positioned by the belt 922 to direct the bagged food products either into engagement with the discharged conveyor 906 of the conveyor assembly 902 or the discharge conveyor 906 of the conveyor assembly 904. In the case of larger sizes of bagged food products, the diverter members 914 direct the bagged food products along a centrally disposed path comprising component parts of both of the discharged conveyors 906.

Figures 29 and 30 illustrate an air assisted collator 950 comprising a first variation of the fourth embodiment of the invention. The collator 950 differs from the collator 900 in that it includes a wide belt discharge conveyor 952 as opposed to the multiple belts 910 of the discharge conveyors 906 of the collator 900. As is best illustrated in Figure 30, the discharge conveyor 952 includes a first, relatively long component 954 and a second, relatively short component 956 which receives bagged food products from the long component 954. A gap 958 is provided between the long component 954 and the short component 956 of the discharge conveyor 952 to

facilitate elimination of trash resulting, for example, from broken food product bags.